

CNHA Grant Report - 2017 Field Season

In 2017 Canyonlands Natural History Association again supported my fieldwork at Comb Ridge and White/Fry Canyon, attempting to survey and better understand the Triassic Period deposits in the region and attempt to tie them to better understood areas in Arizona as well as elsewhere in Utah. Additionally, this work helped expose high school students from Arizona, Utah, and Colorado to real-world science. The season was a success both in terms of providing students with new experiences in the field as well as new scientific discoveries. A brief narrative of the field season is provided here, along with an account of the scientific outcomes of the field season.

Field Season Narrative

On Monday, June 19th the team set out from Fruita, Colorado to make camp at Comb Wash, Utah. In addition to returning field assistant Taormina Lepore and former student (now intern) Xavier Jenkins, we had two returning high school students from Colorado, one new student from Arizona, and one new student from Utah. After a full day of driving, I briefed the team about the importance of the work we were undertaking, gave a Leave No Trace talk and demonstration, and then assisted students who had never been camping before with setup (see below).



On Tuesday, June 20th we traveled to Fry Canyon to monitor and surface collect from the highly significant Portal to NeCrocPolis (P2N). Additional *in situ* material was discovered eroding from the outcrop, 30m north of the main exposure. This material was partially excavated in addition to surface collection of newly eroded material and monitoring (see image to right). After finishing work at P2N for the day, we explored outcrop to the northwest that X. Jenkins had identified as fossiliferous during the preceding week of exploration. A partial phytosaur skeleton was surface collected, as well as the first fish fossil discovered from Fry Canyon before returning to camp.

On Wednesday, June 21st several acres of Chinle exposure was surveyed north of US-95 at Comb Ridge. No significant fossils were located, though several broken, partial teeth were located in a coarse sandy lens near the middle of the Church Rock Member. One archaeological site was located, but it was clear that the site was previously known based on the presence of state survey markers. In the afternoon students were taken to Blanding for showers.

On Thursday, June 22nd the team headed south to the Hills Have Teeth locality, near the southern edge of Comb Ridge. Numerous fossil teeth were recovered, including the largest phytosaur tooth yet discovered at the site. In the afternoon, the team headed further north to prospect the Bread Bowl area and collect fossils located in 2016. The team recovered a partial phytosaur skull from a coquina layer near the middle of the Church Rock Member as well as infilled burrows in a chanel sand deposit near the base of the member (see below).

On Friday, June 23rd, students packed up camp. We surveyed the Chinle Formation again near UT-95 with similar results as before in that no new significant or noteworthy fossil





localities were discovered. After surveying for half the day we headed back to Grand Junction so that students could be picked up and fossils could be unloaded.

Scientific Significance

Several scientifically important discoveries occurred during the 2017 field season, virtually all of which stemmed from student work. As a result, several



in-progress manuscripts were significantly enhanced by the work done in 2017. I've provided a quick run-down of these here.

Triassic dinosaurs from Utah

This paper was published in 2017, reviewing the fossil record of dinosaurs from the Triassic of Utah (Jenkins et al., 2017). This work stemmed from initial discoveries at Comb Ridge, reinvestigation of sites by the team in 2016 in the White Canyon area, and the first authorship of a former student and 2017 internship.

Portal to NeCrocPolis

The P2N site is the densest Triassic deposit yet discovered in the state of Utah. The initial discovery of the site occurred under a CNHA grant in 2016, and additional monitoring, collection, and excavation was carried out in 2017 with CNHA support. This site has yet to be formally published, but data from this site has informed several abstracts and publications (e.g. Uglesich et al., 2017). This site represents the only occurrence of the phytosaur *Pravusuchus* outside of Arizona, the only mass-death assemblage of *Pravusuchus*, and the only evidence of the postcrania of *Pravusuchus*, allowing us for the first time to understand the ecology of this poorly-known animal. Additionally, specimens surface collected in 2017 hint at at least one other taxon in the deposit. There are decades worth of work left at this site; work we would not know needed to be done without CNHA backing.

Hills Have Teeth

The new taxon from Hills Have Teeth is in review at *PeerJ* currently. This manuscript was submitted in February and benefited greatly from specimens discovered during the 2017 field season. This paper is authored by myself, T. Lepore, and X. Jenkins.

Vertebrate traces at Comb Ridge

A previous preprint describing the oldest vertebrate trace fossils from Comb Ridge (Gay et al., 2017) is now in review at *Ichnos*, with additional specimens discovered by X. Jenkins during the 2017 field season.

Infilled burrows

T. Lepore and student Faron Nock spent significant time gathering infilled burrows from Comb Ridge in 2017. These burrows are set to be CT scanned to see if fossilized remains still exist within them. If so, this may help relate the deposits at Comb Ridge to others in Colorado where Chinle burrows with vertebrate fossils within them have previously been discovered. A manuscript is being prepared by T. Lepore, F. Nock, and myself for hopeful submission in 2018 to *Ichnos*.

Paleontology of Bears Ears National Monument

A review paper by Uglesich et al. (2017) was published as a preprint and will be going to review by the end of March. This review surveys work done within the original boundaries of Bears Ears National Monument. The Triassic section relies heavily on work done with CNHA funding in 2016 and 2017.

References

Gay RJ, Jenkins XA, Lepore T. 2017. "The oldest vertebrate trace fossils from Comb Ridge (Bears Ears Region, southeastern Utah)." *PeerJ Preprints* 5:e2662v2

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Gay RJ, Jenkins XA, Lepore T. IN REVIEW. "A new archosauriform from the Upper Triassic Chinle Formation of Utah and Arizona" *PeerJ*

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